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Retropubic Prostatectomy: Lowsley and Gentile of the Department of Urology, James Buchanan Brady Foundation, of the New York Hospital, report upon the operative results in 28 cases in which retropubic prostatectomy was performed by themselves and their associates. They used the technic as described by Millin except for the method of securing hemostasis and of draining the bladder. In their experience, electrocauterization (used by Millin) does not assure complete postoperative hemostasis. For securing artificial drainage, Millin employs a plain No. 18-F. soft-rubber catheter which is secured in position by being sutured to the glans penis. The authors believe that this method has the following drawbacks: (1) a catheter of such small size is readily obstructed by the passage of a small clot, or, if kept in place too long, by the deposition of organic salts in its lumen; (2) fixation of the catheter to the glans causes discomfort when the patient moves, and (3) if, for any reason, the catheter comes out or must be removed within 48 hours following operation, its reinsertion presents a definite hazard because the reinserted catheter may lodge in the space of Retzius.

Both for securing hemostasis of the prostatic cavity and for draining the bladder, the authors use a No. 24-F. Foley catheter with a 30 c.c. hemostatic bag. This has the following advantages: (1) the large calibre of this catheter affords better drainage and permits the passage of small clots which may occasionally remain in the bladder postoperatively; (2) the bag portion of the catheter (which is covered by Gelfoam wet in thrombin), when placed in the prostatic cavity and distended, a) secures hemostasis by exerting gentle pressure, and, at the same time, b) anchors the catheter in position without discomfort to the patient. The Gelfoam is completely absorbed by the time the catheter is removed, usually on the fourth postoperative day.

In order to control bleeding from the vessels of the posterior lip of the bladder orifice, the edges of the mucous membrane are brought together by a superficial running suture of chromic catgut 0000. The authors do this because in their first 2 cases, although bleeding from the prostatic cavity was perfectly controlled by the Foley hemostatic bag and Gelfoam, the patients had bleeding from the vesical orifice for 5 and 6 days respectively.

Twenty-eight patients were operated upon by the method of retropubic prostatectomy. Twelve patients were from 52 to 59; 8 from 60 to 69; 7 from 70 to 79; and one 82 years of age.

The smallest mass of tissue removed weighed 8 Gm.; the largest weighed 100 Gm. In 4 cases the mass of tissue removed was from 8 to 19 Gm; in 11, from 20 to 39 Gm.; in 10, from 40 to 89 Gm.; and in 3, from 90 to 100 Gm.

In the authors' experience this operation is difficult to perform when the prostatic tissue to be removed weighs less than 20 Gm. Not only is enucleation laborious, the plane of cleavage being poorly established, but the amount of capsule remaining makes closure difficult.

There was no operative mortality in this series of 28 cases.

The average postoperative hospitalization was 9 and 1/2 days. Generally, the patients were kept in the hospital for a period of time varying from 4 to 6 days after removal of the catheter (which usually was done on the fourth day). The patient's discharge was dependent upon his being asymptomatic and having good urinary control.

In 20 cases (71 percent) the catheter was removed on or before the fourth postoperative day. The catheter was never removed until the urine was completely clear. Early removal of the catheter, which is desirable in any type of prostatic surgery, has not, in the authors' experience, predisposed to the formation of a suprapubic urinary fistula.

Over half of the patients were up in a chair the day after the operation and walking about on the second day. Sixteen patients were up in a chair the first day; 10 were up on the second; one was up on the third; and one was up on the fourth. Sixteen were walking the second day, 10 the third day, one the fourth day, and one the fifth day.

It has been well established that when patients, especially elderly individuals, are kept in bed for any length of time, there is disturbance of the organic calcium balance, sometimes resulting in serious metabolic and circulatory disorders. The authors, therefore, got their patients up as soon as possible, this mobilization being progressive and completed on the fourth postoperative day, provided the patients were in good general condition, had no severe urinary symptoms, and had no bleeding.

In 25 cases (89 percent) the Penrose drain was removed from the suprapubic wound on or before the third postoperative day. Twenty-three patients had discharge of blood from the wound for no more than 24 hours postoperatively, and the remaining 5 for approximately 48 hours. One patient had leakage of urine for 2 days, which resulted in infection of the space of Retzius. There was a discharge of pus from the wound from the fourth to the eighth day, which subsided under local and systemic treatment with penicillin and sulfadiazine. Another patient had leakage of urine for 10 days, without infection.

In 26 cases (92.7 percent) the suprapubic wound was completely dry by the fifth postoperative day.

The first 2 patients, in whom the authors used the electrocautery for hemostasis, had profuse postoperative bleeding. In the remaining 26 cases, hemostasis was secured as described above; and of these, 21 patients had clear urine on the second day.

In this series, there was no instance of either postoperative incontinence or retention of urine. During the first 48 hours after the removal of the catheter the urinary stream was reduced in size and force, but thereafter became normal.

All but one of the patients had good urinary control by the third postoperative day. In one case (in which the pathological report disclosed areas of early cancer) there was dribbling on coughing which was still present when the patient was last seen, 6 weeks after operation. No further checkup was possible.

Postoperative urethroscopic examination in this series has shown no distortion of the posterior urethra in any case. The vesical orifice appeared round and smooth; there was no residual tissue in the walls of the prostatic urethra, and the verumontanum was normal in appearance.

So far as can be determined from the patients' own statements, the effect of the operation upon sexual function is about the same as following suprapubic prostatectomy.

One patient, after being discharged from the hospital, had pain on attempting to get up and sit down; this started in the suprapubic wound but then changed to the perineum and inner aspect of the thighs, and made walking difficult. He was readmitted and the wound explored, but nothing was found to account for the pain. An x-ray of the pubis proved normal, and the final diagnosis was neuritis of the sacral nerve.

In a second case, the patient had pain in the suprapubic wound 2 weeks after his discharge from the hospital. At the time, the pain was so severe that he was unable to sit up, stand, or walk without assistance. An x-ray of the pubis disclosed no osteitis, and a urethrogram showed a good operative result. When last heard from, 4 weeks after operation, the patient stated that he was considerably improved.

Apart from pain in the suprapubic wound, both of these patients had excellent results from their operations.

Experience thus far has convinced the authors that, providing the postoperative course is bloodless, the retropubic operation is extremely benign and presents, as justification for its acceptance, the following advantageous features:

1. The operative field is amply exposed, and all stages of the procedure are performed under direct vision.

2. There is no injury to, or interference with, any vital organ.

3. The urinary bladder is not opened, thus reducing operative shock, avoiding the inconvenience of delayed healing, and lessening the chance of a persistent fistula. Almost always the wound heals by primary intention.

4. The adenomatous prostate is completely enucleated; and the bladder orifice is well exposed so that, if a subtrigonal-lobe hypertrophy is present, it may readily be removed.

5. The mortality rate is low.

The authors agree with Millin that the retropubic method is comparatively free from the risks and complications encountered in the removal of prostates by the other approaches. These complications include (1) venous thrombosis, (2) secondary hemorrhage, (3) pyelonephritis, (4) postoperative fistula, (5) postoperative stricture, (6) temporary incontinence and retention of urine, and (7) impairment of sexual ability.

Millin believes that, with the exception of fibrotic prostates, which are best treated by transurethral resection, all forms of urinary obstruction can be advantageously removed by the retropubic method. The authors believe that the type of operation should be dictated by the nature of the lesion present, and that every enlarged prostate should not be subjected to the same type of procedure.

Generally speaking, the transurethral approach is the method of choice (1) when the enlargement is confined mainly to the lower hemisphere of the bladder orifice, (2) in fibrous bar at the bladder neck, and (3) in certain types of prostatic cancer (done for palliation only).

Perineal prostatectomy is usually preferable in cases of (1) early prostatic carcinoma, (2) prostatic calculosis, (3) certain types of fibrous prostates that harbor infection and cause rheumatic manifestations, and (4) cases of extravesical benign enlargement of the prostate in which, because of the patient's age, the preservation of sexual power is not a consideration.

Suprapubic prostatectomy is the procedure of choice (1) when benign hypertrophy of the prostate is associated with bladder pathology such as tumor, a large calculus, or diverticulum, and (2) in cases of marked renal insufficiency, when suprapubic prostatectomy in two stages may be required.

The retropubic approach is preferable (1) in many cases of large, adenomatous prostates that can be removed in one stage, (2) when the patient's general condition does not warrant a traumatizing operation, (3) when a shorter period of hospitalization is of great importance to the patient's health, and (4) when, because of the patient's age, the maintenance of sexual function is of the utmost importance.

The report contains a description of the operation with excellent drawings as carried out by the authors. (J. Urology, March '48)

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Retropubic Prostatectomy: Dr. Samuel Bacon of the Department of Surgery, University of Southern California School of Medicine, Los Angeles, reports his experience with retropubic prostatectomy in 32 patients in the Journal of Urology for March 1948. The mortality rate in his series was

3.1 percent (sudden death in one patient proved at autopsy to have been caused by coronary occlusion). Besides a detailed description of the operative procedure, the paper contains several drawings and a picture of Millin's instruments which the author uses.

Doctor Bacon summarizes his report by the following statements:

Retropubic prostatectomy is anatomically sound because no important organs are disturbed or endangered.

All obstructing tissue is removed thereby eliminating the risk of recurrence.

There is practically no danger of postoperative or delayed hemorrhage, nor of persistent fistula, prolonged infection, or urethral stricture. However, the procedure is done in a highly vascular area so that exact and prompt ligation of precapsular veins must be carried out.

Retropubic prostatectomy is an efficient operation, the postoperative period relatively short, and progress remarkably gratifying.

With it, recto-urethral fistula, incontinence and impotence which occur after perineal prostatectomy are avoided.

It is not applicable to prostatic fibrosis, bladder neck contracture, or extensive carcinoma.

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Combined Abdominoperineal Resection for Cancer of Rectum: A study is presented of 138 consecutive combined abdominoperineal resections of the rectum performed in the Cleveland Clinic Hospital from 20 Oct 1941 to 24 June 1943 with only one operative mortality caused by suppression of urine. The technic in all cases was identical, namely, the performance of the Miles operation, with a few modifications for the operator's convenience. Spinal anesthesia with metycaine hydrochloride was used in every case. All wounds were closed primarily with alloy steel wire sutures. No sulfonamide drugs or antibiotics were used in the preparation of the patients or at the time of operation. The series consisted of 93 men and 45 women, ranging in age from 24 to 75 years, the average being 54 years.

It is well known that there is no standard set of symptoms for carcinoma of the rectum and that a diagnosis cannot be made from the patient's history alone because of the tendency of the symptoms to mimic those in other diseases. Abdominal cramps were noted in 10 patients, in 9 of whom the bowel was completely obstructed. In 28 patients, hemorrhoids had been complained of within a period of about six months prior to the diagnosis of malignant growth and in 75 percent of these hemorrhoidectomy had been performed. Anemia was neither

a common nor an important complication of carcinoma of the rectum in this series. Only 18 patients (13 percent) had anemia of any significance. Of these, 15 (11 percent) had only moderate anemia (red cells below 3,000,000). Loss of weight did not commonly accompany carcinoma of the rectum until it was far advanced. Two patients in this series gained weight, 49 (35 percent) lost from 1 to 10 pounds, 37 (27 percent) lost from 11 to 20 pounds, and 13 (9 percent) lost from 21 to 30 pounds. A loss of over 30 pounds was encountered in only 6 cases.

The duration of symptoms before proper diagnosis is made depends on three factors: (1) the patient's neglect in not going to a physician before the condition is in a far advanced stage; (2) disregard of good medical advice; and (3) improper diagnosis of the condition in its early stages. The patients affected by the second factor are those who have been advised concerning diagnosis and proper treatment but choose to disregard such advice and seek quack remedies. The patients affected by the third factor form the largest group.

Of the patients in this series, 75 percent had symptoms for nine months or longer when first interviewed. Only 25 percent had symptoms for from one to nine months.

It is necessary in diagnosing carcinoma of the rectum not only to take a careful history but also to make a complete physical examination, including a thorough abdominal palpation, inspection of the anus, digital examination of the rectum and sigmoidoscopic examination of the rectum and the lower part of the sigmoid colon. Because this was done, the clinical diagnosis was made correctly in 100 percent of the cases studied at the time of the first examination. One hundred and twenty patients (87 percent) had a lesion which was palpable upon digital examination of the rectum. In only 18 cases (13 percent) was a sigmoidoscopic examination required in making the diagnosis. The sigmoidoscope was used in determining the amount of circumference of the rectum involved by the lesion, the amount of fixation of the lesion, the character and type of ulceration of the mucosa, and the approximate distance of the ulceration from the anorectal juncture.

Sigmoidoscopic observations on the distance of the lesion from the anorectal juncture in the group of patients studied can be briefly summarized by saying that in 100 cases (72 percent) the lesions occurred within 10 cm., or slightly less than 4 inches, of the juncture. In 38 (30 percent) the lesions were between 10 and 18 cm. from the juncture. In other words, all the lesions were within easy reach of the sigmoidoscope, and 70 percent were within easy reach of the finger.

Roentgenologic study as a diagnostic procedure in carcinoma of the rectum is of little value and may be misleading because of the great difficulty in demonstrating low lying lesions. In only 3 cases of this series were the roentgenograms of the colon of diagnostic value, and in approximately 25 percent of the cases roentgenologic study had been made before the patients were seen by the authors. Biopsy was carried out in only one case in this series. Because the

diagnosis can be made on the gross appearance of the lesion, the authors consider that biopsy is not necessary, and that it may even be misleading. Often, biopsies of superficial tissue do not reveal the disease when a biopsy of tissue from deep in the tumor would.

When the abdomen is opened, the liver is first explored. The aortic glands are examined, and the fixation of the lesion itself is carefully evaluated. In 87 cases (63 percent) the operation was performed in the standard manner, with no complicating conditions encountered. Preoperative fixation was noted in 41 cases (29 percent), but fixation was encountered at operation in only 38, or approximately 27 percent. In 14 of these it was necessary to remove a portion of the prostate with the rectal growth. Radium seeds were implanted into this prostatic bed or in the surrounding tissue in 6 of the 14. Nodules in the liver, undoubtedly malignant, were encountered in 9 cases. Métastases to lymph nodes were found in 4 cases. In these the operation was done mainly for comfort of the patient. In this entire series a preliminary colostomy for complete obstruction was required in only one instance. Incidental unrelated pathologic changes were encountered at operation in 8 cases of the group, and the performance of other operations simultaneously, that is, hysterectomy, resection of the small bowel and salpingo-oophorectomy, was necessary in only 6 cases. It has been the authors' custom to make the colostomy opening in the midline incision at whatever point it seems to fit comfortably. In 2 cases the umbilicus was excised and the colostomy opening made at that point. In another case a McBurney operation was done on the left side because of two separate lesions, one in the rectum and the other in the sigmoid, both of which were removed. It has been customary also to trim off the excess fat and bowel from the opening on or about the tenth postoperative day and by so doing to ensure better eversion of the mucosal edges and a more satisfactory colostomy from the patient's standpoint.

The average stay of the patients in the hospital from the time of their first entrance for preparation until their discharge was 22.6 days, the maximum being 53 days and the minimum 17 days. The average postoperative stay in the hospital was 18.3 days, the maximum being fifty days and the minimum twelve days.

In all cases herein reported the rectosigmoid, rectum, and anus were removed intact and submitted for pathologic study. In 3 of the cases two separate malignant lesions were found in the same specimen, the lesions in 2 being an adenocarcinoma in the rectum or rectosigmoid and a squamous cell carcinoma at the anorectal juncture. Mucosal polyps separate from the malignant lesion were found in 30 cases (22 percent). In 8 of these there were multiple mucosal polyps. Diverticula were found in 3 cases and endometriosis of the sigmoid in 2.

The average size of the lesions in the series was 29.0 sq. cm. The largest lesion was 71.25 sq. cm., and the smallest was 5.28 sq. cm. The amount of the circumference of the rectal lumen involved by the lesions varied from 10 to 100 percent. The average amount of the circumference involved was 74 percent.

In 102 cases (74 percent) there was no obstruction of the lumen. In 32 cases (23 percent) there was partial obstruction of the lumen, and in 4 (3 percent) the lumen was completely obstructed.

In the entire series the lymphatic nodes only were involved in 7 cases, or 5 percent. The perirectal fat only was involved in 49 cases (35 percent). The fat and nodes were both involved in 67 (40 percent). In 15 cases there was no involvement of the fat or nodes. In the smallest lesion there was no involvement of fat but involvement of 14 percent of the nodes. In the largest lesion of the group there was involvement of fat but no involvement of nodes. From this it can readily be seen that no definite statement can be made concerning the relationship of the size of the lesion to its spread to the surrounding structures.

The authors are certain that the one factor responsible for so few complications postoperatively in this series was the use of alloy steel wire sutures through all layers in closing the abdominal wound. Few ties were made with surgical gut. Most of the bleeding was stopped by pressure and hot packs. In spite of this hematomas occurred in only 3 cases. Prior to the use of steel sutures infected abdominal wounds were common. Twenty-eight percent of the authors' patients in the era before the use of steel sutures had some type of suppuration. Without a doubt these infections of the wound were the beginning of the patient's downfall in a great many instances. The sequence would run thus: infection of the wound, peritoneal irritation, peritonitis as the infection burrowed after the suturing, poor aeration of lungs due to tender splinted abdomen, atelectasis, cough, disruption, and death. With alloy steel sutures, infection rarely resulted. In this entire series infection of abdominal wounds occurred in only 3 cases (2 percent). When infection occurred it cleared more promptly and the danger of hernia or disruption was practically nil. Other important factors in lessening complications were as follows: 1. The authors used no stay sutures of any type because they felt that they were uncomfortable for the patient, that their use courted infection, and that they were entirely unnecessary. 2. They never stitched the serosa of the bowel to the peritoneum or the abdominal wall, because this is always a certain means of producing trouble.

Sixty-eight patients (48 percent) had an absolutely uneventful postoperative course except for disturbances in the urinary tract. Of the remainder, some type of mild obstruction of the small intestines or paralytic ileus developed in 13 (9 percent). This complication first became evident from forty-eight to seventy-two hours postoperatively and was relieved successfully in all cases but one by the use of the Miller-Abbott tube. In that case enterostomy was required for relief. Pulmonary complications occurred in 7 patients; 5 had atelecsis, and 2 had infarctions. The posterior wound was the site of complications in only a few instances. Early postoperative hemorrhage occurred occasionally. It was generally mild, with one or two possible exceptions. Infections of the posterior wound were uncommon. They usually resulted from a pocket having been allowed to form in the depths of the wound. Four of the patients (2.8 percent)

had some type of infection of the posterior wound, in all of whom it was mild and easily taken care of. A fistula of the posterior vaginal wall occurred in 4 cases, with a resulting delay in healing. In these cases the original lesion had been close to the vaginal wall, which had necessitated partial destruction of the wall in the removal of the growth. The area of the colostomy was an infrequent site of complications. Necrosis of the wall down to the fascia occurred in 3 cases, with resultant leak of peritoneal fluid for several days but no other untoward results.

The most consistent and most troublesome complication was infection of the urinary tract and retention of urine. There are probably several reasons for this complication: (1) the disturbance of the innervation of the bladder by the removal of the rectum, (2) the use of a retention catheter for the first 24 hours postoperatively to prevent overdistention of the bladder, and (3) the fact that the posterior wall of the bladder has nothing left to push against when contracting because of the removal of the rectum. This last fact is evidenced by patients who void fairly well for the first three or four days or until the posterior pack has been removed and then cease voiding entirely.

In all men over 50 years of age it was ascertained before operation that prostatic hypertrophy or obstruction to urinary outflow was not present. In spite of this only 3 patients of the group had a postoperative course uncomplicated by some type of urinary disturbance in the form of either cystitis, complete retention, large amounts of residual urine or dysuria. Therefore, it is apparent that most of the morbidity associated with the operation is due to these urinary disturbances. Usually when these disturbances were cleared up, the temperatures would at once return to normal and remain so. The average patient of this group began voiding in adequate amounts 9 days postoperatively. Residual urine in amounts of over 100 c.c. was common for several weeks postoperatively. Complete atonicity of the bladder was encountered in 5 patients (determined cystoscopically), but all eventually demonstrated satisfactory function. Alkali-encrusted areas of cystitis, fistula of the bladder and ureteral fistula occurred in isolated instances. (Arch. Surg., Jan. '48 - T. E. Jones et al.)

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The Effect of Local Compression Upon Blood Flow in the Extremities of Man: The warmth and health of the extremities depend directly upon the adequacy of their circulation, and only indirectly upon the abundance of insulation around them. The question concerning whether the circulation in the limbs is significantly reduced by the application of moderate local pressure is of interest not only to specialists in peripheral vascular disease but to others as well. The Armed Services, for example, have been interested in the circulatory effects of constricting clothes, gloves, and shoes, especially in cold environments where they have been found to be of importance in the incidence of frostbite and of immersion or trench foot.

This study was undertaken to determine the effects of from mild to moderate external compression, uniformly applied to different parts of normal extremities, upon the local blood flow.

The effect of locally applied pressures of from 10 to 50 mm. Hg on the extremities was investigated by three methods, thermometric, blood gasometric, and plethysmographic, previously found valid for estimating blood flow in the extremities under such conditions. The results indicated that local pressures of remarkably low values may impair the circulation. Skin temperature measurements showed a definite effect with pressures as low as 20 mm. of mercury. At this pressure, the arteriovenous oxygen difference rose about 25 percent, and plethysmographic tracings showed an equal decline in blood flow. With a local pressure of 30 mm. Hg, the blood flow decreased about 25 percent as measured both by the blood gasometric and the plethysmographic methods. Even at 10 mm. Hg the plethysmograph revealed a 10-percent decline in blood flow.

Although it was obvious that a reduction in blood flow would occur in an extremity during local compression of considerable degree, it was not known how little compression is necessary to produce this effect. The problem had already been partly investigated by Darling and Belding, whose purpose was to evaluate the role of pressure by foot gear in the development of trench foot. Their method consisted of measuring the skin temperature of various parts of the foot while the subject was in a cold room (0° F. or 4° F.). They found that when a pressure of 50 mm. Hg or more was applied to one foot by means of a pneumatic stocking, it cooled more rapidly than did the opposite foot, which was not compressed. No consistent differences were obtained with pressures lower than 50 mm. of mercury. The authors indicated, however, that their method may not have been sufficiently delicate to detect small changes in blood flow, and also that the intense vasoconstriction in the cold environment may have masked the effects of lower pressures.

The authors consider that the results obtained in this study demonstrate the importance of small degrees of local compression. Thus, pressure on the extremities, such as those ordinarily produced by snug clothing, gloves, shoes, bandages, or splints, or by the weight of the limbs themselves, or even of the bed clothes upon the bony prominences may be sufficient to reduce significantly the circulation in the compressed parts of normal limbs. In patients with peripheral vascular disease, such reduction of blood flow may produce serious results. (Am. Heart J., Feb. '48 - M. H. Halperin et al.)

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Night Cramps in Human Extremities: In October, 1940, the authors reported the successful management of "night cramps" with quinine sulfate.

A new series of 20 patients suffering from nocturnal muscle cramps at rest have been followed in the Vascular Disease Clinic of the Cincinnati General

Hospital over a protracted period for the purpose of investigating both the site of action of quinine sulfate and the physiologic factors responsible for the onset of the cramps.

The reports of Wolf and Kennedy regarding the antagonistic effect of quinine hydrochloride and prostigmine salts upon myotonia and myasthenia gravis prompted the original trial of quinine sulfate for the relief of night cramps. It seemed important, therefore, to recheck not only the beneficial effect of quinine salts but also the action of prostigmine upon patients susceptible to these night cramps. Quinine sulfate, 3 grains (0.2 Gm.), a placebo, and prostigmine bromide, 7.5 or 15.0 mg., were prepared in identical capsules. Patients were started with either the placebo or quinine sulfate originally; if the latter, the placebo was substituted as soon as relief of the night cramps was noted. Three grains of quinine sulfate were experimentally established as the initial therapeutic dose and administered after each meal. The morning dose was of little benefit, except to those experiencing muscle cramps while resting during the day. Three grains of quinine at bedtime were sufficient in some instances; two grains were insufficient for most patients. Faster acting quinine dihydrochloride was given at bedtime to some patients in whom cramps appeared promptly upon retiring. Later, three grains of quinine sulfate after supper supplemented by a similar dose at bedtime proved equally beneficial. Relief was usually obtained on the first or second night. Often it was complete at once; sometimes milder or less frequent cramps persisted for some days after treatment was begun. Repeated alternations with placebo capsules over long periods were possible in many patients. Eventually, after a varying degree of quinine therapy, release of muscle cramps persisted without medication. Whether this was due to the interruption of some metabolic cycle by quinine or to the natural history of the condition could not be established. Night cramps are usually periodic regardless of treatment. Relief, however, was so prompt in all cases and pain recurred so often with placebo capsules that there could be no question concerning the specific action of the drug in this condition.

In those patients who came to the clinic complaining of night cramps and who received prostigmine bromide before the quinine, no alteration in the frequency or intensity of the cramps was acknowledged by any of the patients. One patient who was able to precipitate spasm of the muscles of the leg by forcefully extending his foot for 25 seconds received two ampules of prostigmine methylsulfate (1:2000) without influencing the time of onset of the cramps or the ability to obtain relief from them by pressing his foot upon the floor. Tests were made every five minutes from 20 to 45 minutes after subcutaneous injection of the prostigmine. In only two patients did prostigmine bromide induce muscle cramps after they had been relieved by quinine. This may have been coincidental since quinine gave relief despite continued administration of prostigmine in these patients, and since prostigmine alone, upon discontinuance of quinine sulfate, failed to precipitate spasm.

It is possible that larger doses of prostigmine might have increased the night cramps. The dosage used, however, was adequate to produce other

physiologic effects of prostigmine, the most interesting of which was peripheral vasodilatation. Patients with peripheral arteriosclerosis, though reporting no change in muscle spasms at rest, volunteered the information that their extremity "no longer felt cold," or that "the heaviness" had left, or that "life was back" in a toe which had been numb. Spontaneous burning pains often were abated or were reduced in intensity. One patient in his late forties noted marked improvement in intermittent claudication. The other patients with intermittent claudication were older and obtained little or no relief of muscle cramps on exertion. Perlow also reported that intermittent claudication in arteriosclerotic patients was most refractory to prostigmine therapy.

Another effect of prostigmine was its action on joints with hypertrophic arthritis. Patients noted increased motion in an ankle joint which had been restricted for years, or reported increased mobility in knees or feet. Subsequently, the authors have used prostigmine in a selected group of patients who were suffering from osteoarthritis and have noted improvement in many of them. Trommer and associates recently reported concerning 13 patients with rheumatoid arthritis who showed marked and prompt relief after the use of prostigmine. The authors' series was restricted to patients with hypertrophic arthritis, and they noted beneficial response with relief of pain and stiffness of the joints within from 20 to 30 minutes after the subcutaneous injection of prostigmine methylsulfate. The action may be one of relaxation of periarticular tissues through vasodilatation similar to that produced by short-wave diathermy treatments, rather than relief from spasm by the action of prostigmine within the spinal cord, as described by Kabat and Knapp.

Reports of uncomplicated cases of night cramps were published in the authors' preliminary report. The following additional history is added because of the presence in the patient of concomitant disease as well as because the action of prostigmine is indicated:

B. F., a 60-year-old woman, came to the Vascular Disease Clinic on 1 May 1941, complaining of "night cramps." Her sleep had been disturbed for months by spasms in the calf muscles of the legs. The spasms were more pronounced following unusual activity during the day. In addition, she gave a history of adequately treated syphilis, diabetes mellitus, which was controlled by dietary management alone, and arteriosclerotic heart disease in a state of compensation with digitalis therapy.

Physical examination revealed an alert woman who appeared much older than 60 years. In addition to generalized arteriosclerosis and hypertrophic arthritis, she had a smooth beefy-red tongue and complained that her feet "burned." Oscillometric tracings showed diminished pulsation in both legs. It was decided to postpone treatment for the vitamin deficiency until after the night cramps had been relieved.

Quinine sulfate, 3 grains, was prescribed after dinner and at bedtime. Two weeks later, she reported complete relief of the night cramps. This relief started on the day after quinine was first given. Quinine sulfate was continued and, to combat the vitamin deficiency, thiamine chloride, 15 mg., together with an ounce of dried brewer's yeast, was given daily.

During the next six weeks there was much improvement in the vitamin deficiency. The dose of thiamine and yeast was thereafter kept constant and quinine sulfate therapy alternated with a placebo and prostigmine. On 28 July, she reported severe night cramps following the substitution of the placebo capsule for the quinine. Quinine sulfate was again administered for one month, and

by 20 August, only one muscle cramp had occurred. On 17 September, no night cramps were reported despite the fact that quinine sulfate had been discontinued two weeks before. This persistent relief following the discontinuation of the drug is a typical clinical effect of varied periods of quinine administration in patients with night cramps. At this time prostigmine bromide was substituted for the quinine. On 24 September, no cramps had appeared following prostigmine bromide, 7.5 mg., after dinner and at bedtime. Then prostigmine bromide, 15 mg., three times a day was administered. On 22 October, no cramps had been noted. The patient reported slight weakness and sweating following the use of "these capsules." The dose of prostigmine was then reduced to 7.5 mg. three times a day. On 29 October, the patient reported only one slight night cramp. She volunteered the information that movement of her "stiff joints" was freer. Prostigmine was administered for more than a month with no return of the night cramps. Vitamins were administered throughout this period. During the month of December, only the yeast and thiamine were administered. In January, she reported no return of night cramps but her joints again "became stiff" following the discontinuance of prostigmine.

Night cramps appear to result from the action of some end product of metabolism, as in diabetes, or from poor elimination of normal end products of muscle metabolism, as in patients with venous stasis due to varicose veins, pregnancy, or following deep venous occlusion. Increased muscular activity favors the development of night cramps in the rest which follows such activity. No etiological or therapeutic relationship exists between intermittent claudication and muscle cramps at rest.

Quinine sulfate has been found to give prompt relief of night cramps in extremities. Evidence indicates that the action of quinine is directly on muscle, rather than on the myoneural junction. This drug produces a refractory period in skeletal muscle that is similar to the refractory period in heart muscle.

Prostigmine, the supposed pharmacologic antagonist of quinine, failed to increase the intensity or frequency of night cramps when administered in doses sufficient to produce the vasodilating effect of the drug. (Am. Heart J., March '48 - H. K. Moss and L. G. Herrmann)

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Therapy Directed at the Somatic Component of Cardiac Pain: Nearly twenty years ago Weiss and Davis, in 25 cases of visceral disease, which included two of heart disease, demonstrated that visceral pain may be relieved by local anesthesia of the somatic tissues concerned in the reference of pain. However, the therapeutic import of their observations became lost in the issues which developed concerning the theoretical role of the so-called "somatic reference zone" in the mechanism of visceral pain reference.

The authors of this report, likewise, have found that local block of afferent neural impulses from the somatic structures which mediate referred visceral pain may relieve pain due to heart disease under suitable conditions.

Clinical Data. The authors studied 31 patients with chest pain due to coronary artery disease, who presented trigger areas in the voluntary muscles, and in whom an attempt was made to block the noxious impulses from these

abnormal foci either by local procaine infiltration or by ethyl chloride spray. These observations on pain of cardiac origin have been oriented against a background of experience in a larger number of patients with chest pain and somatic trigger areas activated by disorders of the skeletal muscles rather than by heart disease.

The common denominator of cardiac and somatic chest pain in these subjects is the presence of a trigger mechanism in the somatic structures. It is, therefore, necessary first to define the abnormal zone of hypersensitivity known as a trigger area. Its essential characteristic is that when it is stimulated by pressure or needling, it gives rise to a brief reference of pain. The referred pain is usually perceived at a distance from the trigger area, but, as in the case of the precordial muscles, it may circumscribe the trigger area itself. In either case, the spread of pain represents a true reference phenomenon, since it does not conform to an area supplied by a peripheral nerve.

The distribution of pain referred from trigger areas is relatively constant for the site of origin; thus, similarly located trigger areas in different individuals produce similar, and therefore, predictable pain reference patterns. As a consequence, in skeletal muscle disorders without organic heart disease, the appropriate trigger areas give rise to referred pain which is indistinguishable in distribution and quality from the substernal and radiating pain of coronary insufficiency.

Although trigger areas reside occasionally in the skin, the authors have found them to be located in most instances within the myofascial structures. It is not known what tissue within the muscle mass becomes physiologically altered so as to constitute the trigger area, but the authors have observed that in the process of biopsy of a trigger area without anesthesia (except morphine), lightly touching, lifting, or pinching the outer fibrous sheath of the muscle at this spot momentarily reproduced the specific pattern of pain reference which characterized this trigger area and which had been previously elicited by pressure.

Location of Trigger Areas. Muscles which frequently develop trigger areas in association with coronary artery pain are the pectoralis major and minor and the serratus anterior. The patterns of referred pain induced by mechanical stimulation (needling) of trigger areas in these and other muscles of the chest and shoulder girdle have been mapped both in the presence and absence of heart disease. As has been implied, the patterns are similar whether the trigger mechanism is activated by cardiac or somatic factors.

It has been found that trigger areas in the myofascial structures of the parasternal region give rise to pain perceived chiefly beneath the sternum. Trigger areas in the lateral part of the precordium, where the pectoralis major and minor muscles overlap, give rise to pain widely distributed over the precordium, occasionally referred to the scapula and frequently to the medial epicondyle of the elbow and ulnar distribution in the forearm and hand. Trigger areas in the inferior margin of the pectoralis major muscle at its

mid-point include the nipple and breast in their reference pattern. Trigger areas close to the ribs in the lowest slips of the pectoralis minor muscle at their origin often produce pain located deep within the chest and described as "inside the heart." Trigger areas anterior to the sternum in the rudimentary sternalis muscle give rise to a reference of pain which may extend up and down from the base of the neck to epigastrium. Trigger areas in the axillary region in the serratus anterior muscle induce a spread of pain at the corresponding level which travels anteriorly almost to the sternal border and posteriorly as far as the interscapular line, and occasionally to the volar aspect of the arm as far as the palm. Trigger areas in the serratus muscles are apt to cause pain on deep inspiration, or a sense of constriction of the chest.

With a precise knowledge of these reference patterns, the search for trigger areas is facilitated if the patient gives a clear description of the location of spontaneous pain. However, the essential part of the examination is the discovery by careful palpation of discrete areas of exquisite tenderness. Thus, the examiner may suddenly locate a small spot of hyperalgesia so acute that the patient winces when it is palpated. The hyperalgesia may be truly cutaneous, but usually it is only seemingly cutaneous because of overlying an area of hypersensitivity. This is shown by the fact that the skin may be lifted off the deeper structures and compressed without inducing pain, whereas even light pressure against the skin when it is in contact with the underlying structures elicits a painful response.

When an extremely sensitive trigger area is stimulated by pressure, the patient usually describes a reference of pain clearly perceived at a distance. On the other hand, if the spread of pain induced by pressure circumscribes the trigger area, the subject may fail to distinguish the reference of pain from the local hyperalgesia at the trigger area itself. With the stronger stimulus of needling the trigger area, however, the reference pattern is usually sharply delineated.

Local Block Technics. Local Infiltration. Since the relief of pain by so-called "analgesic" injection is not dependent on the local anesthetic action of a drug, the concentration of procaine hydrochloride in physiologic saline has been reduced for infiltration to from 0.25 to 0.5 percent. One reason for using any procaine at all is that even such low concentrations appreciably reduce the immediate pain induced by the infiltration.

The patient is questioned regarding sensitivity to procaine, and if a history of allergy is obtained or if the patient has never before received procaine, either physiologic salt solution is used for injection, or an initial test dose of from 5 to 10 mg. of procaine hydrochloride is given intramuscularly and the patient observed for ten minutes for a general reaction. The total dose of procaine hydrochloride at the first treatment is limited to 100 mg. and is stepped up gradually at subsequent treatments if necessary. If the patient is unduly apprehensive and has not received previous sedation, a preliminary dose of a rapidly acting barbiturate is given by mouth.

In infiltrating trigger areas in the muscles, it is not necessary to infiltrate the skin. There is also no need to withdraw on the plunger of the syringe to determine whether the point of the needle lies within a blood vessel if dilute solutions of procaine are used and if infiltration is performed with the needle constantly moving in or out. The needle is kept in motion in order to reach as many muscle layers as possible, and also to avoid introducing more than a drop or two of the procaine solution into a blood vessel, if one were entered. Furthermore, the intravenous injection of procaine in the nonallergic individual no longer connotes the same hazards as formerly, and is being widely used by this route in a variety of clinical conditions.

The depth of injection depends on the site of the trigger area. At the sternal borders, the musculature is thin and the trigger areas therefore superficial. Laterally, the pectoral muscles are thicker and the trigger areas may be fairly deep, especially where the thoracic cage falls away from the skin surface. Therefore, in a muscular person it may require a two-inch needle (23 gauge) to infiltrate a trigger area in the pectoralis minor muscle. For more superficially located trigger areas in the pectoralis major and serratus muscles, a needle from one to one and one fourth inch (24-gauge) is used. The needle should not be inserted up to the hilt because of the difficulty of extraction in case of breakage. It should be inserted at a tangent to the ribs to assure that the pleural cavity is not penetrated.

For a given trigger area the amount of solution injected is usually about from 1 to 4 c.c., but less may suffice. If local tenderness at the trigger area is not abolished, reinjection in the same area at a different depth or angle is employed.

Pyrogen-free solutions are used. When pyrogenic materials are injected into trigger areas, intense afterpain may result.

Ethyl Chloride Spray. A technic somewhat modified from that recommended for sprains is employed. A standard glass container, preferably with a nozzle which delivers a fine spray, is used. The tube is held about two feet from the patient. The spray is applied not perpendicularly, but at an acute angle or even at a tangent to the surface of the skin. It is applied with a constant rotary motion of the wrist so as not to concentrate it in a small area. The spray is usually applied for about from 5 to 15 seconds at a time; it is discontinued if the skin becomes blanched. Frosting is to be avoided; if frost appears, it is promptly wiped off.

To avoid inhalation of ethyl chloride vapor, an adequate circulation of air is desirable. Since the vapor is heavy and travels downward, it is preferable that the spray should be applied with the patient sitting up, or at least propped up with pillows. The usual precautions for the handling of a volatile inflammable substance should be observed.

Spraying is continued at brief intervals until the spontaneous pain has disappeared. If pain persists, this procedure is stopped after about from 10 to 15 minutes.

If ethyl chloride spray fails to relieve pain, local infiltration of the trigger areas may be tried. However, the return of the skin to room temperature should first be awaited because ecchymosis has followed immediate needling of a heavily sprayed area.

Results. In this study the 31 subjects with pain due to inadequacy of the coronary circulation were classified into three groups: Group 1, 4 with constant chest pain initiated by an acute myocardial infarct and no pain prior to this event; Group 2, 18 with effort angina associated with antecedent or intercurrent myocardial infarction; and Group 3, 9 with effort angina uncomplicated by a known myocardial infarct. Omitted from consideration were the results of local block therapy in those other patients with chest pain who had equivocal or no evidence of coronary artery disease. The patients in Group 1 provided the most convincing demonstration that cardiac pain may be blocked at the somatic component. The four subjects had had a total of five myocardial infarcts and prolonged substernal or precordial pain following each of these events, but no anginal pain previously. The duration of pain prior to treatment ranged from 4 hours to 21 days. One of these patients had marked hypertension (200/110). Complete relief of the protracted pain was secured in all instances, either by local procaine infiltration of the trigger areas in the precordial muscles, or by ethyl chloride spray of the discrete tender areas in the precordium, or by a combination of both procedures. In four infarctions, complete relief was immediate, and one treatment sufficed to secure a permanent result. In one infarction, temporary amelioration of pain occurred after the first local block, but four such treatments were necessary to obtain lasting complete relief.

In the 18 patients of Group 2 with both effort angina and myocardial infarction, analysis of the results of local block of the somatic component indicates that this procedure may be effective when the anginal syndrome appears soon after an acute myocardial lesion. Of 12 patients with this type of onset, all received significant relief of both the severity and frequency of anginal attacks, as indicated by increased physical activity and decreased use or discontinuance of nitrites. These patients received an average of about 6 treatments by local procaine infiltration given at weekly, or occasionally, at biweekly intervals. Ethyl chloride spray was employed in only one patient; in this patient, numerous trigger areas were present in the skin as well as in the deeper structures. In three of the 12 patients with postinfarction onset of pain, the effort angina was completely abolished by local block therapy even when normal activity was resumed (three, four, and four months of observation after treatment, respectively); effort angina had been present since infarction for four, three, and one and one-half months, respectively. In one case in which anginal pain had been present for as long as ten years since myocardial infarction, marked relief was secured by local infiltration. A long duration of chest pain, therefore, does not preclude a good result in these postinfarction anginal syndromes.

The results in these twelve patients of Group 2, the onset of whose effort angina followed infarction, are to be contrasted with those obtained in the remaining 6 patients in this group, in whom the anginal syndrome antedated the first myocardial infarct and in whom local block therapy was instituted some

time after infarction. In these patients with effort angina of gradual onset, persistent treatment extending even over many months afforded at the best only partial relief, and the anginal syndrome reverted to its previous severity soon after local block therapy was discontinued. These relatively unsatisfactory results are similar to those observed in the 9 patients of Group 3 with effort angina of insidious onset, but without acute myocardial infarction. On the basis of the response to local block therapy, the 15 patients (six of Group 2 and nine of Group 3) with effort angina of insidious onset appear to represent one class, irrespective of whether infarction occurred intercurrently or not. The therapeutic result in this group is so different from that noted previously in the twelve patients with postinfarction onset of effort angina that various factors have been analyzed to insure that these represent comparable groups. The proportion of men was high in both, namely, 87 percent in the former and 75 percent in the latter. The average ages were 58 and 59 years, respectively, with almost identical ranges. Marked hypertension was present in 33.3 and 25 percent, respectively; this difference is not considered statistically significant. In the patients with angina of insidious onset, the duration of anginal pain prior to therapy ranged from 4 weeks to 8 years, as compared with from 6 weeks to 10 years in the patients with angina precipitated by infarction. In conclusion, it may be stated that except for the type of onset of effort angina, no important differences could be discovered in these two groups.

Discussion. Experimentation in animals and human subjects has led to controversy concerning whether local anesthetization of the somatic tissues in the area where pain is perceived can block the referred pain induced by direct stimulation of a viscus. Wolff and Hardy have stated that when pain results from the persistence of primary visceral or other deep noxious stimulation and is associated with (somatic) hyperalgesia, its intensity may be modified by superficial and deep procaine infiltration in the hyperalgesic zones.

The data of the authors suggest that the somatic trigger mechanisms which apparently mediate referred cardiac pain are usually located within the skeletal muscles, although they may reside also in the skin. In the latter instance, cutaneous as well as deep hyperalgesia is present, and a reference of pain may often be elicited by mechanical stimulation of the skin itself. It would be expected that surface anesthetization would reduce pain only when hyperalgesia of the skin is present, since it has been found that the effect of procaine infiltrated at the site of hyperalgesia and referred pain (induced by tooth stimulation) is the more dramatic the greater the hyperalgesia and headache previously produced. The authors have observed, however, that ethyl chloride spray may be effective in relieving referred pain even when no hyperalgesia of the skin is detectable. Although the mechanism of action of this agent in blocking somatic trigger mechanisms is not yet established, the superficial nature of its effects for the technic employed suggests the possible importance of tactile and other stimuli from the relatively normal skin in the maintenance of the pain cycle. It has been inferred that reinforcement of the effects of noxious stimuli by nonnoxious stimuli takes place within the association areas of the cerebral cortex.

The authors' observations indicate further that the noxious stimuli from the heart, continuing after acute myocardial infarction, are of such a nature that the pain cycle initiated by this event can usually be blocked at the somatic component. Why this is so can readily be understood in the case of the constant pain which may continue for hours or days after such brief trauma to the heart. The conditions may be regarded as analagous to those which exist in joint sprain when pain is immediately and permanently relieved by temporarily blocking the trigger mechanisms established in the periarticular structures, in spite of the persistence of gross signs of trauma. It may be assumed that in the postinfarction cardiac pain syndromes, the initial insult to the heart leads to the rapid development of somatic trigger areas within the so-called "reference zone" of the visceral lesion. Soon after the activation of the somatic trigger mechanism, the noxious impulses from the primary source in the heart cease spontaneously, and the continuation of pain then depends on an autogenic cycle of nerve impulses maintained by the secondary sources in the somatic structures. Blocking the somatic component may be expected permanently to abolish pain when the somasensorium pain cycle has become self-sustaining without further dependence on afferent impulses from the heart.

In the case of the intermittent pain (effort angina) precipitated by acute myocardial infarction, it is somewhat harder to understand why blocking the somatic component modifies pain for any length of time, since it is clear that a primary source of noxious impulses is still present in the heart. It would be anticipated that, under such circumstances, constant reactivation of somatic trigger mechanisms would occur as the result of the intermittent barrage of fresh impulses from the heart, and that, therefore, block of the secondary sources would produce only temporary or negligible benefit.

One explanation of the good therapeutic results actually observed in this group of cases is based on the concept that spatial summation of cardiac and somatic impulses occurs in the central nervous system. Thus, it is conceivable that when the stimuli initiated in the heart are subthreshold, the sensorium does not register pain unless they are reinforced by stimuli from somatic trigger areas. It may be postulated further that these subthreshold stimuli from the heart are no longer capable of activating new trigger areas after those initiated by high intensity stimuli at the time of infarction have been removed by local block. That pain impulses may at times travel directly from the heart to the brain without mediation of somatic structures is suggested by the failure to demonstrate trigger areas in the precordium in some patients with acute myocardial infarction or effort angina.

Another explanation for the protracted relief of postinfarction effort angina by local block therapy is based on the possibility that the somatic trigger mechanisms contribute to the perpetuation of the primary source of pain. Although these data provide no evidence that noxious impulses from somatic trigger areas may modify conditions in the heart, the inference that such reflex effects may occur receives support from the work of several investigators. Lindgren showed that anginal pain in subjects with coronary artery

disease was reduced or abolished during local anesthetization of precordial structures, as measured by changes in anoxia and exercise tolerance tests; this effect was attributed to improvement in the coronary circulation during local block of somatic impulses. Furthermore, it has been shown that reflex vasoconstriction in localized areas of another visceral system, namely, the brain or spinal cord, may accompany activity of somatic trigger mechanisms, and that localized vasodilatation in the central nervous system may follow local block of the appropriate somatic trigger areas. If comparable relationships apply to the heart, local block of the somatic trigger areas concerned in the reference of cardiac pain would result in release of coronary vasospasm and possibly, therefore, in removal of the primary source of noxious impulses in the heart.

The unsatisfactory response to local block therapy in the group of patients with effort angina due to progressive coronary insufficiency indicates that such intermittent work-ischemia of the heart muscle provides conditions unlike those which exist in postinfarction effort angina. Two possibilities present themselves to explain the relatively poor therapeutic result in angina of gradual onset. It may be that the fresh impulses initiated in the heart with each attack of pain are of an intensity and duration adequate for the continual reactivation of somatic trigger areas. Or a preponderance of these fresh impulses may travel directly to the sensorium, so that spatial summation of cardiac and somatic impulses is not essential for the perception of pain. In either instance, local block of the somatic trigger areas would be expected to afford negligible or temporary relief of anginal pain.

The authors' interpretation of the results of local block therapy as presented in the foregoing is in harmony with the categories of referred pain recently formulated by Wolff and Hardy.

It is to be hoped that theoretical considerations regarding neurophysiologic mechanisms will not obscure the clinical value of local block procedures for the symptomatic relief of cardiac pain. The crucial nature of these observations in the subjects with continuing pain after acute myocardial infarction leaves no room for doubt that under suitable conditions cardiac pain may be abolished by local block of the somatic component. Furthermore, the importance of eliminating all possible factors which may induce reflex spasm of collateral coronary arteries is emphasized by experiments which show that interruption of the reflex arc by ablation of the cardiosensory pathways appreciably lowers the mortality rate following ligation of the coronary arteries in dogs. These findings, together with the observations of Lindgren, undermine the concept, occasionally encountered, that pain, especially anginal pain, is a protective mechanism to limit the load placed on the myocardium with an inadequate coronary circulation. (Am. Heart J., Feb. '48 - S. H. Rinzler and J. Travell)

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Roentgen Therapy in the Carotid Sinus Syndrome: In the February 1948 issue of Radiology, C. A. Stevenson and R. D. Moreton, working at the Scott

and White Clinic, Temple, Texas, report on a series of 24 patients with the carotid sinus syndrome in whom roentgen rays were used as the sole therapeutic agent. In 1939 five of these patients were reported upon in Radiology by one of the authors (C.A.S.).

The carotid sinus syndrome may present a variety of symptoms and findings, but, because of the efferent pathways from the carotid sinus, the syndrome is usually one of three types: in the first type the reflex arc is to the medulla and then, via the thalamic region, to the cerebral cortex. When this is the area over which the impulses travel, the main symptom is syncope. In the second type, the reflex arc is apparently from the sinus via the sinus nerve and its connection with the vagus nerve. When the reflex arc is over this pathway, the outstanding finding is cardiac slowing or even asystole. In the third type, the reflex arc is from the sinus, via the sinus nerve and its connection with the glossopharyngeal nerve, to the superior cervical sympathetic ganglia. When this arc is followed, there is a fall in blood pressure without cardiac slowing.

All 24 patients in this series showed a duplication of their attacks when pressure was applied over one or both carotid sinuses. When the patient returned to the clinic, he was again seen by the same physician, who attempted to reproduce the carotid sinus attacks. Many patients had electrocardiograms made at the time of carotid sinus pressure.

No specific drug therapy was advised for any of this group, but it is of interest to note the report of Robinson on the use of benzedrine sulfate in a series of 9 patients. The average dose of this drug needed to prevent attacks by carotid sinus pressure was from 20 to 40 mg. 3 or 4 times a day. One patient had insomnia and one developed a tolerance to the drug. The authors have not been enthusiastic about any type of prophylactic drug therapy for these patients because of the long duration of the illness and the variability of the time interval between attacks.

The age of the 24 patients in this series varied from 27 to 71 years, and the duration of symptoms before roentgen therapy varied from 2 months to 15 years. Eight patients showed the cerebral type of carotid sinus syndrome, and 16 had a vagal type of response on carotid sinus pressure. Only 4 of the patients were females.

There was no incidence of obvious disease of the carotid sinus itself, and no patient had any type of pathologic change in the soft tissues of the neck. Hypertension and arteriosclerosis have seemed to be incidental findings. Most patients had two or more courses of roentgen therapy, and the same technical factors were used whenever the treatment was repeated.

The authors have now more or less standardized the treatment as follows: 200 kv. constant potential, 1 mm. copper and 1 mm. aluminum filter, 50 cm. target-skin distance; 400 r, measured in air, are given in one dose to one side

of the neck, the opposite side being treated in the same manner on the following day. The clinician who exerts the pressure on the carotid sinus notes the area over which the response is elicited and this is then taken as the center of the field of irradiation. A 10 x 10 cm. field is usually adequate.

From this treatment, 10 patients obtained complete relief from their attacks, 6 partial relief, 4 slight, 3 none, and 1 patient could not be traced, but 5 months after roentgen therapy, carotid sinus pressure showed no effect.

Roentgen therapy appears to be of definite prophylactic value, over a considerable time, in cases of the carotid sinus syndrome.

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High Serum Acetylcholine Concentrations in Pernicious Anemia and Their Reduction by Effective Therapy: Evidence based on animal experiments tends to show that liver extract and pteroyl glutamic acid may cause remission of anemia by lowering the acetylcholine concentration of the blood serum, probably by increasing cholinesterase activity. Part of this evidence was found in the fact that continued injections of acetylcholine into dogs caused hyperchromic anemia which was responsive to antipernicious anemia treatment. Other work has shown that acetylcholine derivatives can produce changes in the central nervous systems of dogs, some of which resemble changes reported to occur in human pernicious anemia.

Serum acetylcholine concentrations were estimated by a method which has been described elsewhere (Am. J. Physiol., 147, 404, 1946), and which employs the biological assay technic used by Chang and Gaddum, except that a muscle chamber of 6 c.c. capacity is employed.

The human subjects included in this study consisted of 5 patients with pernicious anemia who were examined during relapse and after from 4 to 7 days of treatment, and two other patients who were in therapeutic remission. Six apparently normal persons, and six with secondary anemias were also tested.

The six "normal" individuals had from 0.2 to 0.25 micrograms of acetylcholine per 3 c.c. of serum, or from 6.6 to 8.2 micrograms per 100 c.c. of serum. The six patients with secondary anemias had acetylcholine concentration of the same or a slightly higher order, i.e., from 6.6 to 9.9 mg. per 100 c.c. of serum. Their serum cholinesterase activities were quite variable in range, but even in those with low values, the acetylcholine concentrations were reasonably close to what may be considered normal. The serum cholinesterase values were low in those patients whose red cell counts were below 2 million, and in the single case of leukemia.

In pernicious anemia in relapse, the five patients showed markedly elevated acetylcholine concentrations in the serum which ranged from about 15 to 33

micrograms per 100 c.c. In these patients, also, the serum cholinesterase activity was low when the red cell count was below 2 million per cubic millimeter of blood.

Three of the patients with pernicious anemia were treated with pteroylglutamic acid (Lederle's Synthetic L. casei factor), one was treated with liver extract, and one with stomach, U. S. P. (Ventriculin). All responded to treatment. The reticulocyte percentages, of from 6 to 38 percent, were obtained near the times of the peak response. The varied forms of treatment reduced the serum acetylcholine levels to normal within from 4 to 7 days. Cholinesterase activities at this time were increased in one patient, diminished in two, and virtually unchanged in two.

The presence of a high concentration of acetylcholine in the serum of patients with pernicious anemia during relapse raises the question of whether the excess of this chemical might possibly be the ultimate chemical cause of the disease. This suggestion becomes more of a probability in view of the fact that acetylcholine has been shown previously to be capable of producing a hyperchromic anemia in dogs which is responsive to all effective antipernicious anemia treatments. Also in favor of this idea, is the fact that the effective treatment of pernicious anemia reduces the acetylcholine concentration of the serum to normal before any increase in the erythrocyte count has occurred. This suggests that a positive factor (i.e., acetylcholine) may in some manner depress or arrest the maturation of cells in the bone marrow in pernicious anemia. When the excess of this factor (hormone or metabolite) is reduced by effective treatment, one would expect that normal maturation of cells at a normal rate in the marrow would be resumed.

Such a conception of the causation of pernicious anemia does not, of course, explain how an excess of acetylcholine in the serum comes to exist. It would appear from the experiments that the serum cholinesterase activity is not far below normal in some cases of pernicious anemia. It also seems that at about the fifth day after beginning treatment with liver or folic acid, the acetylcholine concentration is reduced, but the cholinesterase activity (as measured) may be unchanged or even diminished. This lack of early effect of treatment upon serum cholinesterase activity in pernicious anemia is in sharp contrast with the author's observations upon other normal and diseased people, including those with leukemia, in whom the administration of folic acid usually caused an immediate rise in serum cholinesterase activity. It may well be that effective treatment in pernicious anemia first causes an increase in blood cell cholinesterase. Indeed, Sabine has demonstrated that the cholinesterase activity of whole blood and blood cells is low in pernicious anemia and that there is an early increase from the second to fourth days following the institution of effective liver extract therapy. She also found that the serum cholinesterase activity was slightly decreased, increased, or unchanged during the first week of therapy, and this observation is confirmed in the author's work.

The acetylcholine concentrations found by the author to prevail in the serum of normal human beings are of the same order as those reported by Chang and Gaddum for the blood of the horse, dog, and ox.

To the author's knowledge, the serum acetylcholine concentrations reported in this paper are the first estimations of this substance that have been made on human blood serum in health and disease. (Am. J. Digest. Dis., Feb. '48 - J. E. Davis)

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Nomenclature of Streptomycin Preparations: Recent studies of the nature of the antibiotic produced by Streptomyces griseus have brought out two important facts: (a) the organism produces, in addition to streptomycin, two and possibly three or more antibiotics; one is present in the mycelium, and another, designated as "actidione," is found in the culture filtrate and is active only against fungi; (b) streptomycin itself, as originally defined on the basis of biological and certain chemical criteria, is not a single chemical entity, but a mixture of at least two chemically related substances. The major constituent of this mixture is undoubtedly the substance which is now known, from the degradation studies, to possess the structure of an o-glycoside of the disaccharide streptobiosamine (N-methyl-L-glucosaminido-streptose) with streptidine (1,3-diguanido-2,4,5,6-tetrahydroxycyclohexane). The only other representative of this type which has been isolated in pure form and chemically characterized is streptomycin B; it always seems to occur in association with the previous compound, and differs from it by the presence of an additional D-mannose moiety in the molecule. Streptomycin B is characterized by an antibiotic spectrum which differs quantitatively from that of the pure chemical entity originally isolated.

Thus, the elucidation of the nature of the "streptomycin complex" presents a close parallel to the advances in our knowledge of the "penicillin complex." As a further analogy to penicillin, crude streptomycin preparations contain impurities, some of which may act as "enhancement factors."

It need hardly be emphasized that the isolation of several chemical entities from the "streptomycin complex" introduces considerable uncertainty in the interpretation of data obtained with impure preparations containing both of the above compounds in unknown proportions; this is true especially in the correlation of chemical with biological assay data and of in vitro activities with therapeutic and toxicity effects in animals.

Pending the establishment and acceptance of reliable biological and chemical differential assay methods for the determination of the various compounds in mixtures, it would seem desirable to reach an agreement at least on the definition and naming of the antibiotically active materials and entities concerned. It is suggested, therefore, that the following nomenclature be adopted for products possessing streptomycin activity:

Streptomycin complex. This term should be used, in a sense originally proposed for streptomycin, to designate that group of antibiotics which is characterized by the antibacterial spectrum and certain chemical and physical

properties assigned to it. This term would, therefore, have to be applied to all crude or partly purified preparations containing various forms of streptomycin and inactive impurities in unknown proportions.

Streptomycin. This term designates the compound, chemically defined as N-methyl-L-glucosaminido-streptosido-streptidine. Accordingly, the term "streptomycin A," which has been suggested for this entity by implications, is not to be used.

Mannosidostreptomycin. This term designates the entity formerly named streptomycin B and now chemically defined as D-mannosido-N-methyl-L-glucosaminido-streptosido-streptidine.

Streptomycin residue. It is suggested that this term be applied to any residues which exist after the removal of highly purified streptomycin from impure streptomycin preparations and which may either have inherent antibiotic properties or act as enhancement factors.

Streptomycin-like substances. Any preparations, produced by organisms other than Streptomyces griseus, which show an antibiotic spectrum and other biological and chemical properties similar to those of streptomycin should be so designated. When they are crystallized and their chemical composition is determined, their exact nature may be established. This is true, for example, of streptomycin II. (Science, 5 Mar '48 - S. A. Waksman)

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Vacuum Investing for Dental Castings: In the October 1947 Journal of Dental Research, Ralph Phillips, working in the Department of Dental Materials, Indiana University School of Dentistry, Indianapolis, Indiana, reports on a study to determine the relative merits of vacuum investing of small castings, compared with a careful hand technic.

On the basis of 800 experimental castings it is concluded that smooth small castings, free from bubbles and nodules, can be produced routinely either by use of vacuum equipment or by a careful hand technic. However, for an inexperienced or inept operator such results are easier to obtain with vacuum apparatus, since the human element is reduced. The time necessary to carry out the investment procedure is the same for both methods. Vacuum investing produces a denser mass of investment, as measured by an air flow meter, which results in slightly greater crushing strength of investment. The increased density of the investment in turn produces a denser gold surface. This is entirely a surface condition and the practical significance is not known. The water-investment ratio and setting time are not altered appreciably by the use of vacuum. The temperature change in the wax pattern is only -2° F. under normal operating conditions. The only evidence of distortion caused by vacuum occurred on the steel MOD die, in approximately 1 out of every 3 made. This can be eliminated on this particular die by attaching the sprue on the occlusal surface rather than on the proximal wall.

Development of a Strain of Houseflies Resistant to DDT: Because DDT is being widely used on a great variety of insect pests, and because it is much superior to the older insecticides for the control of houseflies, tests were made at the laboratory of the Bureau of Entomology and Plant Quarantine, Orlando, Florida, to determine whether the extensive use of this chemical on several generations of houseflies would eventually produce flies that were resistant or tolerant to DDT.

Approximately 300 houseflies from the regular laboratory colony were exposed to a DDT fine-mist spray in a 100-cubic-foot chamber, described by Lindquist and Madden. One milliliter of a 1-percent DDT-kerosene spray was discharged into this chamber, and the flies were exposed for 2 minutes. About 10 percent of the flies survived, and these were used as the parent stock in establishing a new special colony. Each of 14 generations of flies was similarly exposed to DDT, and the survivors were placed in clean cages and allowed to propagate.

In 16 paired tests with approximately 1,600 4- and 5-day-old flies of the 14th generation, the average mortality was 68.5 percent for the regular stock and 34 percent for the special flies. These data show that selective breeding produced a strain of flies that was more resistant to DDT spray than were flies from the regular stock. (Science, 12 Mar '48 - A. W. Lindquist and H. G. Wilson)

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Susceptibility of DDT-Resistant Houseflies to Other Insecticidal Sprays: Lindquist and Wilson have described (see the previous article) the development of a special strain of houseflies (Musca domestica L.) that was comparatively resistant to DDT space sprays. This strain was developed by rearing for a number of generations the progeny of individuals that recovered from the effects of DDT sprays.

To determine whether the resistance in this strain was specific for DDT, a large series of paired tests was conducted in which 5 insecticides, in addition to DDT, were tested as space sprays against the 15th, 16th, and 17th generations of this special stock of flies in comparison with flies from the regular colony. Both strains had been reared by the same technic. The 5 insecticides used were technical chlordane, rotenone, chlorinated camphene, pyrethrum extract (containing 20 percent of pyrethrins) mixed with piperonyl cyclonene, and Thanite (a mixture of fenchyl and bornyl thiocyanoacetate). In another series of tests the two stocks of flies were compared for their susceptibility to residual deposits of DDT. The 21st and 22nd generation of the special stock were used in these tests.

In the first series of tests, the special stock was distinctly more resistant to all the materials than the regular colony. Although a few reversals occurred in the individual tests, none appeared in the final averages at any concentration. To obtain equal mortalities, approximately twice as much toxicant was required for the special stock as for the regular stock with DDT, chlordane, pyrethrum, and rotenone. An even higher proportion of chlorinated camphene was needed, but with Thanite somewhat less than twice the amount was required for the special stock.

In the next series, each sex of the special stock of flies was definitely more resistant to DDT residues than the corresponding sex of the regular flies, and the increased resistance appeared to be approximately equal to that shown in the space-spray tests. Twice as long an exposure, or even more, was required to cause mortalities among the special stock equal to those of the regular stock.

These tests show that the method of selection resulted in the development of an unusually strong stock of flies rather than one having a specific resistance to DDT. This stock also showed an increased resistance to the effect of residual deposits of DDT. In view of the increasing use of DDT sprays for housefly and mosquito control, it seems possible that, in time, a similar increase in resistance may occur under natural conditions. (Science, 12 Mar '48 - H. G. Wilson and J. B. Gahan)

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Salmonella from Dogs and the Possible Relationship to Disease in Man: Relatively little information is available concerning the infection of dogs with bacteria of the genus Salmonella.

Of public health interest are several Scandinavian reports in which outbreaks of human salmonella infection were shown to be epidemiologically related to salmonella infections among dogs. Kauffmann reports an outbreak of gastro-enteritis involving 6 members of a family of 7 and the family dog. S. glostrup was isolated from the feces of all members of the family and from the blood of the infected dog. Although the origin of infection was not determined, it was assumed that the sources of infection for man and dog were identical. Caspersen reports an instance in which an infected dog was the source of a paratyphoid outbreak involving 6 human beings. S. schottmülleri was the causal organism isolated in the human cases. The diseased dog was incriminated as the source on the basis of the clinical history and serological tests. Another instance in which the dog was considered the source of a human paratyphoid outbreak is described by Magnusson. The causative organism, isolated from the involved dog and human beings was S. abortus-canis.

A study was initiated by the Bureau of Disease Control and Bureau of Laboratories, Michigan Department of Health, Lansing, Mich., to collect data pertaining to the incidence and significance of salmonella organisms among dogs. In this study, fecal specimens were collected by means of a rectal swab technic adapted from that described for human beings by Hardy. One hundred and sixty-eight fecal specimens were collected from 100 dogs. The swabs were dropped directly into tetrathionate broth and incubated for from 18 to 24 hours at 37° C. Growth from triple sugar slants showing salmonella-like reactions was tested with polyvalent salmonella serum. Those cultures agglutinated by the serum were sent to the Salmonella Typing Station where identification was made on the basis of biochemical reactions and antigenic analysis.

Salmonella types were recovered from the stools of 18 of the 100 dogs examined. The following types were identified: S. manhattan, S. newport,

S. minnesota (both monophasic and diphasic varieties), S. oranienburg, S. typhimurium, S. bredeney, S. worthington, S. give, S. cubana, S. cerro, S. kentucky, S. illinois, and S. meleagridis. There were two types isolated to which the antigenic formulae of XXVIII:y and III,XV:z_{10} respectively were ascribed.

The 16 types recognized in this work are serologically, biochemically, and morphologically similar to those frequently infecting man, birds, and other animals. Consequently an epidemiological relationship may exist between dogs, birds, man, and other animals. To the writers' knowledge, of the types found in this work, only S. give, S. bredeney, S. newport, and S. typhimurium previously have been reported from dogs. On the other hand, all of the 16 types have been isolated as suspected pathogens from human beings with the possible exceptions of those organisms with the antigenic formulae III,XV:z_{10} and XXVIII:y.

It is difficult to assess the pathological significance of these salmonella types for dogs on the basis of this limited study. The combined data from the Michigan State College Veterinary Clinic and the Animal Shelter indicate some association of these organisms with distemper or enteritis, or both. On the other hand, the kennel findings suggest the possibility that these kennel dogs were transient carriers. In any event it appears that the dog may serve as a more frequent host of salmonella than has been thought in the past. (Am. J. Pub. Health, March '48 - A. H. Wolff et al.)

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Staff Corps Review Board: The Staff Corps Review Board, convened by the Secretary of the Navy to study the over-all problem in connection with alleged inequities in the assignment of running mates and the promotion of all Staff Corps officers, and to recommend such action to be taken by the Navy Department as may be found justified, met on 18 February 1948. In its study, the Board will analyze the relationship between all officers of the Navy, line and staff, and the assignment of running mates to all Staff Corps officers during the period of operation of the wartime Temporary Promotion laws, 24 July 1941 to 7 August 1947. Although the Board is primarily concerned with the alleged inequities in the assignment of running mates, it has the authority to study any matter considered relative or pertaining to the assignment of running mates and to the promotion of Staff Corps officers.

The Bureau of Medicine and Surgery has representation in the Board membership. All matters pertaining to the alleged inequities in the assignment of running mates in the Medical Corps have been submitted to the Board for consideration.

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Grade of Warrant Officer Established for Dental Technicians: All Ships and Stations Letter number 48-171 (N.D. Bulletin of 15 March 1948), which made certain changes in the structures for enlisted and warrant grades, established the title of dental clerk for commissioned warrant and warrant officers.

This letter listed the names of 19 former pharmacists and chief pharmacists who have been designated as the first group of commissioned warrant and warrant officers to become dental clerks.

A candidate for appointment as warrant officer, dental clerk, designator 8172, must be qualified in the following ways: He should exhibit officer-like qualities in general bearing, appearance, alertness, loyalty, tact, industriousness, cooperativeness, executive ability, and ability to handle men. He should be serving under continuous service as a chief dental technician or dental technician, first class. He should have served not less than three years in the Navy, with not less than two years of that time on board vessels of the Navy or outside the continental limits of the United States, and not less than one year of that time as chief dental technician or dental technician, first class. He must be competent in rating and have an intimate knowledge of the duties of dental technicians of all classes.

Warrant officers, after six years' service in grade, become eligible for appointment as chief warrant officers.

Commissioned warrant officers and warrant officers who are dental clerks are general administrative assistants to dental officers, perform special clerical duties, and supervise dental laboratories. They are thoroughly familiar with dental property accountability, personnel management, and clinic supervision. They are accountable for all equipment and stores in their charge, exercising personal supervision over the condition and the economical expenditures thereof, and reporting any deficiencies directly to the dental officer. When attached to a unit or an activity going into or out of commission, they personally supervise the checking and testing of all equipment in their department. They take such battle station and station for daily quarters as may be assigned by the commanding officer. (Dental Div., BuMed)

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Navy Public Relations in General: The objectives of Navy Public Relations are to create public confidence in the Navy and to create Navy confidence in the public, with a mutual exchange of respect and understanding so as to insure a maximum contribution to national security.

All officers and men of the Navy whenever and wherever they come in contact with our own people and with those of other countries are, consciously or unconsciously, public relations representatives. The person in uniform, often without saying a word, freely interprets the Navy in its role as a public servant. Each person in the Navy, then, being a public relations representative, directly participates in the development of a friendly public understanding toward the Navy and rightfully shares in the public confidence and support which he helps to achieve.

We must all realize that good will is a by-product of our own actions. Therefore, how we deport ourselves in all our dealings with others (including particularly our own personnel of the Reserves and regular Navy) will determine what they think of the Navy. (Office of Public Information, BuMed)

Circular Letter 48-32 (Not released in time for this issue.)

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Circular Letter 48-33 19 March 1948

To: Distribution List

Subj: Naval Medical Supply Depot, Guam, M.I.; Mission of

Ref: (a) CNO ltr OP-40E-1er, NH18/A3-1, Serial 168P40, dtd 5 Mar 1948 to BuMed.

1. In accordance with the authority contained in reference (a), the mission of the Naval Medical Supply Depot, Guam, M.I., is as follows:

(a) To procure, store, prepare for shipment, and deliver to transshipment agencies standard medical supplies and equipment for all U. S. Naval and Marine Corps activities under the command of ComMarianas, including service craft, attached small craft, naval defense forces in the Marianas, and dependents of service personnel.

(b) To procure, store, and issue standard medical supplies and equipment required in the treatment of the civil populations of Guam and the Trust Territories, in accordance with the policy established by SecNav.

(c) To provide medical supply support to fleet units at Guam, and incidental vessels as may be required.

(d) To maintain on hand, in accordance with CNO approval, such reserves of standard medical material as may be directed by the Bureau of Medicine and Surgery.

(e) To provide facilities for, and accomplish the salvage and repair of medical supplies and equipment.

(f) To identify and dispose of Navy surplus materials under the control of the Naval Medical Supply Depot.

(g) To perform such stores and cost accounting functions as may be designated by the Bureau of Medicine and Surgery.

(h) To perform such additional accounting, incident to proper function of the depot, as may be designated by ComMarianas with the concurrence of the Chief of the Bureau of Medicine and Surgery.

Note: The Marshall Island sub-area, including Kwajalein, will be supplied by NMSD, Pearl Harbor.

--BuMed. C. A. Swanson

Circular Letter 48-34 22 March 1948

To: All Ships and Stations

Subj: Care of Dead Procedure

1. The disestablishment of the Naval Hospital, Brooklyn, New York, is tentatively scheduled for 30 June 1948. In view of its pending disestablishment and its greatly reduced personnel, as of this date that hospital will handle only cases where death actually occurs therein. It is directed that the following cases be transferred to the Naval Hospital, St. Albans, Long Island, New York.

(a) Remains of naval personnel returned from beyond the continental limits of the United States and arriving in New York.

(b) Preparation, encasement and transportation of remains of naval personnel who die aboard ships or at activities in the New York City area.

(c) Other cases of death under the jurisdiction of the Navy in the New York City area.

(d) Remains which are to be interred in Long Island National Cemetery, Farmingdale, New York.

--BuMed. C. A. Swanson

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Circular Letter 48-35 23 March 1948

To: All Ships and Stations

Subj: Radiological Health Data, Record of

Ref: (a) BuMed Circular Letter No. 48-10, Radiological Safety Regulations

1. Reference (a) directs that certain physical and laboratory examinations be made on personnel exposed to radiological hazards.

2. Results of all such examinations shall be entered in the health record medical history sheet, listing any abnormalities and indicating action taken. Photodosimetry records shall be entered monthly indicating dosage and number of days exposed for the month and total dosage to date. Explanation shall be entered of any unusual radiological exposure.

3. Upon detachment or reassignment of exposed personnel, the total cumulative exposure shall be noted in the medical abstract.

--BuMed. C. A. Swanson

Circular Letter 48-36 24 March 1948

To: All Ships and Stations

Subj: Naval Vessels and Aircraft, Disinsection of

Refs: (a) General Order 252, dtd 26 Sept 1947, Quarantine Regulations for Naval Vessels.
(b) General Order 249, dtd 26 Aug 1947, Quarantine Regulations for Naval Aircraft.
(c) MMD, Part III, Chapter 5C, Quarantine Procedures.

1. Vessels.--Before arriving in port the medical officer (or senior representative of the medical department) aboard a naval vessel shall make an inspection to determine whether insects capable of transmitting disease exist aboard. In the event disease vectors are discovered, suitable disinsection procedures will be recommended to the commanding officer. Such procedures include treatment of spaces with aerosol insecticide at the rate indicated on label of container. Spaces should be closed and ventilators secured during treatment. Collections of water in small boats on deck and in similar situations should be treated when such situations present evidence of breeding of mosquitoes or other disease vectors. Disinsection in these situations ordinarily will be accomplished by eliminating the breeding source, or in certain instances by spraying the surfaces with standard Navy insecticide (liquid) or with liquid 5 percent DDT preparations.

2. Aircraft.--Where disinsection of aircraft is required by the naval district commandant, area commander, or senior naval officer in command of an embarkation area, pursuant to paragraph 12, reference (b), disinsection must be accomplished immediately before take-off by treatment with aerosol insecticide at the rate indicated on label of container or at the rate of six (6) seconds spraying per one thousand (1,000) cubic feet of space. Spraying with aerosol insecticide should be accomplished with all hatches and doors secured. After disinsection, hatches and doors should not be opened before take-off.

3. Disinsection should always be accomplished on leaving ports where yellow fever is known to exist. Similarly, special attention should be directed to disinsection of vessels and aircraft proceeding from areas where malaria mosquitoes exist to areas where these insects do not exist. Particular cognizance should be taken of cargo loaded from plague-infected ports.

4. In the event question arises as to whether disinsection has been successfully accomplished, or where any special problem of insect infestation exists not amenable to disinsection procedures herein recommended, request for assistance should be made by the vessel or aircraft commander to quarantine officials at the seaport or airport upon arrival.

5. This circular letter supplements instructions at present found in reference (c).

--BuMed. C. A. Swanson

Circular Letter 48-37 26 March 1948

To: All Naval Stations and Marine Corps Activities

Subj: Ambulances; Accountability, Custody, Assignment, Maintenance, and Replacement of

Refs: (a) SecNav ltr dtd 19 December 1945
(b) Chapter 20, Par. 3100, Manual of the Medical Department
(c) Chapter 20, Par. 3079, Manual of the Medical Department
(d) Par. 63011-1 and 2, BuSandA Manual
(e) BuMed C.L. 46-166 dtd 15 Nov 1946
(f) NavMed-855 "Object and Subobject Classification of Medical Department Appropriational Estimates, Obligations and Expenditures" (Reprinted from NDB 15 July 1945)
(g) SecNav ltr dtd 26 Dec 1947, Subj: Automotive vehicles - Maintenance of Records and Assignment of USN numbers

This letter (1) states that reports being received in the Bureau from field activities indicate a considerable variance from the prescribed property accountability procedures concerning the receipt, custody, assignment, maintenance, and replacement of Medical Department ambulances assigned to shore activities, particularly at those activities which are not under the management control of BuMed; and (2) gives information and instructions for effecting the procedures as required.

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Circular Letter 48-38 31 March 1948

To: All Ships and Stations

Subj: Patients' Jackets and Clinical Records (Items 31, 41, and 43, BuMed Field Records Schedule); Instructions Concerning.

Refs: (a) BuMed Circular Letter 48-15 dtd 9 Feb 1948
(b) Par. 12B11.5(c) ManMedDept.
(c) Par. 514.1, ManMedDept.

1. Reference (a) is hereby cancelled.

2. Subject records for the years prior to 1940 with copies of the patients' registers shall be transferred to the Naval Records Management Center, 605 Stewart Avenue, Garden City, Long Island, New York, for forwarding to the National Archives for permanent custody and servicing.

3. Records dated 1940 and thereafter shall be transferred to the Naval Records Management Center for temporary custody and servicing when they are five years old or upon disestablishment of an activity. When a patient has repeated admissions to the same hospital, the complete jacket shall be retained until the most recent record is five years old. The pertinent registers covering the clinical records shall be microfilmed and the microfilm copy forwarded with the records to the Records Center; or if microfilming is not feasible, the original registers shall be forwarded by registered mail to the Records Center on a loan basis. The Records Center shall microfilm the register and retain the film strips at the Center to be used as finding media for the clinical records. Immediately upon completion of microfilming the register shall be returned to the appropriate hospital by registered mail.

4. When it becomes necessary to refer to the above transferred records, requests shall be addressed directly to the Director, War Records Office, National Archives, Washington 25, D. C., or the Director, Naval Records Management Center, New York, as appropriate. Nothing shall be added to or detached from these records, except that in the case of patients being rehospitalized a notation shall be added showing the name of the activity and readmission date; and the record shall be returned as soon as practicable.

5. On admission to a hospital the patient shall be assigned a new registry number. Upon readmission to that hospital the patient shall be assigned the same registry number used for previous admissions. Patients' clinical records shall be filed in numerical sequence and the file of clinical records shall be broken (segregated by year) each calendar year. The clinical record number shall run consecutively year after year. Where a patient continues on the sick list beyond the calendar year the individual record shall not be broken.

6. Reference (b) will be revised accordingly in the near future.

--BuMed. H. L. Pugh

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Circular Letter 48-39 31 March 1948

To: All Ships and Stations

Subj: Object and Subobject Classification of Medical Department Appropriational Estimates, Obligations and Expenditures

Ref: (a) BuMed ltr L1-2/EN10(073) dated 7 July 1945; Navy Dept. Bulletin 45-801 of 15 July 1945 and NavMed 855 (Reprint from NDB of 15 July 1945)

1. Upon receipt of this letter, the following changes will be made in ref (a):

Subobject Symbol and Title	Correction to be made
0192 - Other Fee Services	Delete: "(1) Fees for blood donor service."
061 - Forms and Letterheads, including Tabulating Cards	Delete: Entire paragraph under this subobject and Add: (For Bureau authorization only).
083 - Office Supplies	Delete: Third paragraph under this subobject and Add: New paragraph "Charges for printed forms and tabulating cards when procured under contract or from District Printing Plants."
0891 - Medical and Surgical Supplies	Add new paragraph: (6) Fees for blood donor service.

--BuMed. H. L. Pugh

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Circular Letter 48-40 31 March 1948

To: Activities Under Management Control of the Bureau of Medicine and Surgery (Selected List).

Subj: Color Manual for Naval Shore Establishments, Distribution of

1. The Office of Industrial Relations, in conjunction with the Bureau of Yards and Docks, by a contract negotiated with Faber Birren and Company of New York, has produced a color manual. This color manual is an approved comprehensive schedule for painting, the use of which, it is hoped, will contribute to accident prevention, and will be a guide in the choice of suitable colors for the decoration of buildings of the Medical Department.

2. Three copies of this manual, numbered to encourage greater care and to identify them in the instance of misappropriation, are being mailed by the Bureau of Yards and Docks.

3. It is directed that when painting is necessary, and money is available, the color to be used shall be selected in accordance with the uniform standards contained in this manual. It will be noted that these standards limit the number of colors to twenty-four that will be required to be kept on hand. The requirements of the sections dealing with safety and fire protection should be effectuated as soon as practicable.

4. It is requested that acknowledgement of receipt of these color manuals and the identifying number thereon be made to the Bureau of Medicine and Surgery.

--BuMed. C. A. Swanson